

```

H -----MGPTLAVPTPYGCIGCKLPQPEYPPALIIFMFCAMVITIVVDLIGNSMVILAVTKNKKLRNS
M MATVPKSNMGPTKAVPTPFGCIGCKLPKPDYPPALIIFMFCAMVITIVVDLIGNSMVILAVTKNKKLRNS
R -----

H GNIFVVSLSVADMLVAIYPYPLMLHAMSIGGWDLSQLQCQMVGFITGLSVVGSIFNIVAIAINRYCYICH
M GNIFVASLSVADMLVAIYPYPLMLYAMSVGGWDLSQLQCQMVGLVTGLSVVGSIFNITAITAINRYCYICH
R -----YCYICH

H SLQYERIFSVRNTCIYLVITWIMTVLAVLPNMYIGTIEYDPRTYTCIFNYLNNPVFTVIVCIHFVLPLL
M SLQYKRIFSRLNTCIYLVVTWVMTVLAVLPNMYIGTIEYDPRTYTCIFNYVNNPAFTVIVCIHFVLPPLI
R SLQYNADLQPANTCIYLVVTWVMTVLDVLPNVYIGTIEYDPRTYTCYFNYVNNPAFTVIVCIHFVLPPLI

H IVGFCYVRIWTKVLAARDPAGQNPNDNQLAEVRNFLTMEFVIFLLFAVCWCPIINVLTVLVAVSPKEMAGKIP
M IVGYCYTKIWIKVLAARDPAGQNPNDNQFAEVRNFLTMEFVIFLLFAVCWCPIINVLTVLVAVIPKEMAGKIP
R IVGYCYTKIWIKVLAARDPAGQNPNDNQFAEVRNFLTMEFVIFLL-----

H NWLYLAAFYFNSCLNAVIYGLLENFRREYWTIFHAMRHPIIFFPGLISDIREMQEARTLARARAH
M NWLYLAAFYFNSCLNAIIYGILNESFRREYWTIFHAMRHPILFISHLISDIRETWETRALTRARVRA
R -----

H RDQAREQDRAHACPAVEETPMNVNRNVPLPGDAAAGHPDRASGHPKPHSRSSSAYRKSASTHHKSVFHSK
M RDQVREQERARACVAVEGTPRNVNRNVLLPGDASAPHSDRASVRPKPQT-----RSTSVYRK
R -----

```

Fig. 1A

H AASGHLKPVSGHSKPASGHPKSA-TVYPKPASVHFVKGDSVHFVKPDSVHFVKPASSNPKPITGHH
M PASIHHKSI SGHPKSA SVYPKPASSVHCKPASVHFVKPASVHFVKGDSVYFKGDTVHYRAAS---KLVTSHR
R -----

H VSAGSHSKSAFSAATSHPKP-----IKPATSHAEP TTADYPKPATT SHPKPAAADNP ELSASHCPEIPAIA
M ISAG-----PSTSHPTSMAGYIKSGTSHPATTTVDYLEPATTTSHSVLTAVDLPEVSASHCLEMENTSTG
R -----

H HPVSDSDLPESASSPAAGPTKPAASQLES DTIADLPDPTVVTTSTNDYHDVVVVD-----VEDDPDEMAV
M HLRAD-----ISASVLPSPPELAATP-----PDTTAIP IASGDYRKVVLIDDDSDDCSDEMAV
R -----

Fig. 1B

TGTTTGCTGTGGACCTGGCTGCTGATCCTGAGCCTGCTGGGAGATCTTAACGATCCCCAGAGCAACATGGGGCCCCACCCCTAG
CGGTTCCCAACCCCTATGGCTGTATTGGCTGTAAAGTACCCAGCCAGAAATACCCACCGGCTCTAATCATCTTTATGTTCTGCGC
GATGGTTATCACCATCGTTAGACCTAATCGGCACTCCATGGTCATTTGGCTGTGACGAAGAACAGAAGCTCCGGAATCT
GGCAACATCTTCGTGGTCAGTCTCTGTGTGGCCGATATGCTGTGGCCATCTACCCATACCCCTTTGATGCTGCATGCCATGTCCA
TTGGGGGCTGGGATCTGAGCCAGTTACAGTGCCAGATGGTCGGGTTTCATCACAGGGCTGAGTGTGGTGGCTCCATCTTCAACAT
CGTGGCAATCGCTATCAACCGTTACTGCTACATCTGCCACAGCCCTCCAGTACGAACGGATCTTCAGTGTGCGCAATACCTGCATC
TACCTGGTCATCACCTGGATCATGACCGTCTGGCTGCTGCCAACATGTACATTTGGCACCATCGAGTACGATCCTCGCACCT
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CACCAAGTCTGTCTTTAGCCACTCCAAAGGTGCCCTCTGGTCACCTCAAGCCTGTCTCTGGCCACTCCAAAGCCTGCCCTCTGGTC
ACCCCAAGTCTGCCACTGTCTACCCCTAAGCCTGCCCTCTGTCCATTTCAGGGTGACTCTGTCCATTTCAGGGTGACTCTGTCCA
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TCCAAGTCTGCCCTTCAGTGTGCCACCAAGCCACCCCTAAACCCATCAAGCCAGCTACCAGCCATGCTGAGCCCACTGCTGACT
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AGCCAGCTGGAGTCTGACACCATCGCTGACCTTCCCTGACCCCTACTGTAGTCACTACCAGTACCAATGATTACCATGATGTCGTGG
TTGTTGATGTTGAAGATGATCCTGATGAAATGGCTGTGTGAAAAATGCTCTCGTAGGTGGCCAGGCAGT

Fig. 2A

AAGATCCTGAGCTTGCCCTGGGAGGAATGGCCACGGTCCCAAGAGCAACATGGACCTACAAAGGCGGTGCCACCCCATTCGGC
TGCAATTGGCTGTAAGCTGCCAAAGCCCGACTACCCCGCAGCTCTAATCATCTTTCATGTTCTGCGCAATGGTCATCACAGTCGTCTG
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TACCACTGCAATCCCCCATTTGCCCTCTGGTGATTACCGCAAGGTGCTGCTTATTGATGATGATTCTGATGATTCTGATTCGCTCTGAT
GAGATGGCTGTGTA

Fig. 2B

TACTGCTACATCTGCCACAGCCTCCAGTACAATGCGGATCTTCAGCCTGCTAACACTTGCATCTATCTGGTTGTACCTGGGTCA
TGACTGTTCTGGATGTCCCTAATGTGTACATTGGCACCAATTGAGTATGACCCCTCGCACCTACACCTGCTACTTCAACTATGT
GAACAACCCCTTTACTGTGACCAATTGTCTGCATCCACTTCGTCCTCCCTCTCATCATAGTCGGTTATTGCTACACAAAAATC
TGGATCAAAGTGCTGGCAGACCGGGAGCCAGCTGGACAGAAATCCTGACAACCAGTTTGCTGAGGTTCCGAAATTTTCTAACCATGT
TTGTGATCTTCCTCCTT

Fig. 2C

Fig. 3



Fig. 4B

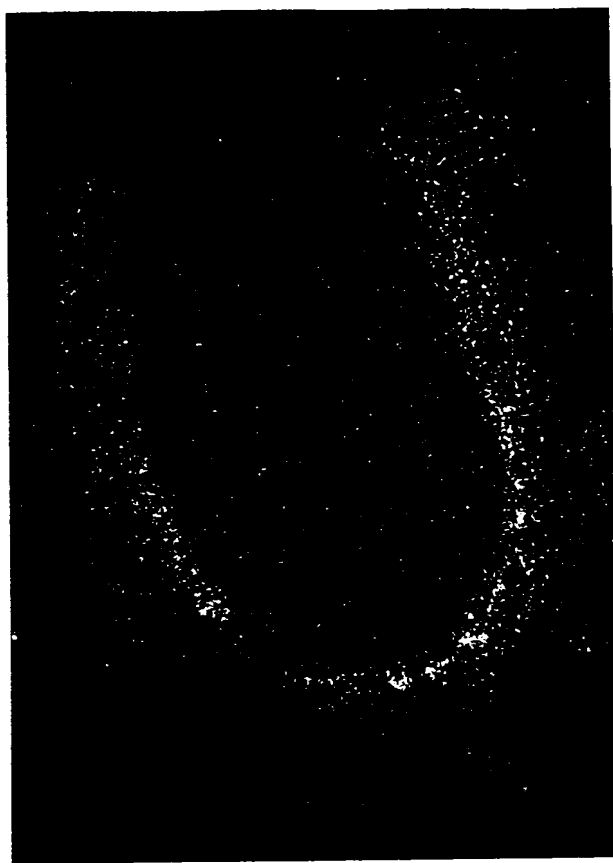


Fig. 4A





Vertebral Disk

Fig. 4C

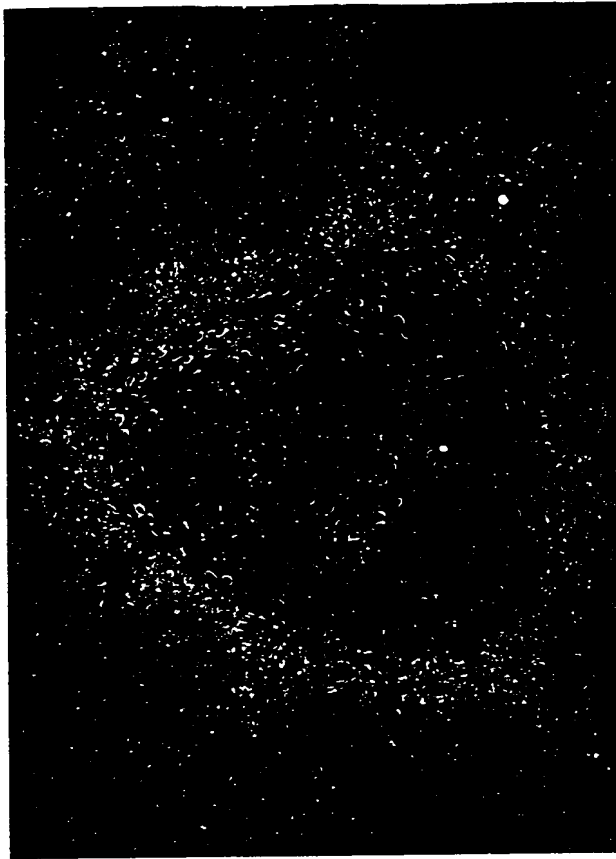


Fig. 4D

AF003625 27599 tgtttgctgtctggacctggctgctgatacctgagcctgctgggagatcttaacgatcccc
 U52219 1 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 tgtttgctgtctggacctggctgctgatacctgagcctgctgggagatcttaacgatcccc

AF003625 27659 aggagcaacatggggccaccctagcgggtccaccaccctatggctgtattggctgtaag
 U52219 61 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 MRR AA 1 aggagcaacatggggccaccctagcgggtccaccaccctatggctgtattggctgtaag
 M G P T L A V P T P Y G C I G C K

AF003625 27719 ctaccagccagaataccaccggctctaatacatcttattgttctgcgcgatggttattc
 U52219 121 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 MRR AA 18 ctaccagccagaataccaccggctctaatacatcttattgttctgcgcgatggttattc
 L P Q P E Y P P A L I I F M F C A M V I

AF003625 27779 accatcggttagacctaatcggaactccatgggtcattttggctgtgacgaagaacaag
 U52219 181 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 MRR AA 38 accatcggttagacctaatcggaactccatgggtcattttggctgtgacgaagaacaag
 T I V V D L I G N S M V I L A V T K N K

Fig. 5A

AF003625	27839	aagctccggaattctgg	
U52219	241	aagctccggaattctgg	
MRR AA	58	K L R N S G	
AF003625	30712	ttcaggcaacatcttcgtggtcagtcctctctgtggccgatatgctggtggccatctaccc	
U52219	252	ttctggcaacatcttcgtggtcagtcctctctgtggccgatatgctggtggccatctaccc	
MRR AA	62	S G N I F V V S L S V A D M L V A I Y P	
AF003625	30772	ataccctttgatgctgcacatgccatgtccattgggggctgggatctgagccagttacagtg	
U52219	312	ataccctttgatgctgcacatgccatgtccattgggggctgggatctgagccagttacagtg	
MRR AA	82	Y P L M L H A M S I G G W D L S Q L Q C	
AF003625	30832	ccagatgggtcgggttcacacagggtgagtggtcggtcccatcttcaacatcgtggc	
U52219	372	ccagatgggtcgggttcacacagggtgagtggtcggtcccatcttcaacatcgtggc	
MRR AA	102	Q M V G F I T G L S V V G S I F N I V A	

Fig. 5B

AF003625	30892	aatcgctatcaaccgttactgctacatctgccacagcctccagtagcgaacggatcttcag	
U52219	432	aatcgctatcaaccgttactgctacatctgccacagcctccagtagcgaacggatcttcag	
MRR AA	122	I A I N R Y C Y I C H S L Q Y E R I F S	
AF003625	30952	tgtgcgcaatacctgcacatctacctgggtcatcacctggatcatgaccgtcctggctgtcct	
U52219	492	tgtgcgcaatacctgcacatctacctgggtcatcacctggatcatgaccgtcctggctgtcct	
MRR AA	142	V R N T C I Y L V I T W I M T V L A V L	
AF003625	31012	gcccacatgtacattggcaccatcgagtagatcctcgcacctacacctgcatcttcaa	
U52219	552	gcccacatgtacattggcaccatcgagtagatcctcgcacctacacctgcatcttcaa	
MRR AA	162	P N M Y I G T I E Y D P R T Y T C I F N	
AF003625	31072	ctatctgaacaaccctgtcttcactgttaccatcgtctgcacccacttcgtcctccctct	
U52219	612	ctatctgaacaaccctgtcttcactgttaccatcgtctgcacccacttcgtcctccctct	
MRR AA	182	Y L N N P V F T V T I V C I H F V L P L	

Fig. 5C

AF003625	31132	cctcatcgtgggtttctgctacgtgaggatctggaccaaaagtctggcgccccgtgaccc
U52219	672	cctcatcgtgggtttctgctacgtgaggatctggaccaaaagtctggcgccccgtgaccc
MRR AA	202	L I V G F C Y V R I W T K V L A A R D P
AF003625	31192	tgcagggcagaatcctgacaaccaacttgctgaggttcgcaattttctaaccatgtttgt
U52219	732	tgcagggcagaatcctgacaaccaacttgctgaggttcgcaattttctaaccatgtttgt
MRR AA	222	A G Q N P D N Q L A E V R N F L T M F V
AF003625	31252	gatcttcctcctctttgcagtgctggtggccctatcaacgtgctcactgtcttggtggc
U52219	792	gatcttcctcctctttgcagtgctggtggccctatcaacgtgctcactgtcttggtggc
MRR AA	242	I F L L F A V C W C P I N V L T V L V A
AF003625	31312	tgtcagtcgccgaaggagatggcagggaagatcccccaactggctttatcttgcagcctactt
U52219	852	tgtcagtcgccgaaggagatggcagggaagatcccccaactggctttatcttgcagcctactt
MRR AA	262	V S P K E M A G K I P N W L Y L A A Y F

Fig. 5D

AF003625 31372 catagcctacttcaacagctgcctcaacgctgtgatctacgggctcctcaatgagaattt
 |||||
 U52219 912 catagcctacttcaacagctgcctcaacgctgtgatctacgggctcctcaatgagaattt
 MRR AA 282 I A Y F N S C L N A V I Y G L L N E N F

AF003625 31432 ccgaagagaatactggaccatcttccatgctatgcggcaccctatcatattcttctctgg
 |||||
 U52219 972 ccgaagagaatactggaccatcttccatgctatgcggcaccctatcatattcttccctgg
 MRR AA 302 R R E Y W T I F H A M R H P I I F F P G

AF003625 31492 cctcatcagtgatattcgtgagatgcaggagcccgctaccctggcccgcccggtgcccc
 |||||
 U52219 1032 cctcatcagtgatattcgtgagatgcaggagcccgctaccctggcccgcccggtgcccc
 MRR AA 322 L I S D I R E M Q E A R T L A R A R A H

AF003625 31552 tgctcgcgaccaagctcgtgaacaagaccgctgccccatgcctgtcctgctgtggaggaaac
 |||||
 U52219 1092 tgctcgcgaccaagctcgtgaacaagaccgctgccccatgcctgtcctgctgtggaggaaac
 MRR AA 342 A R D Q A R E Q D R A H A C P A V E E T

Fig. 5E

AF003625	31612	cccgatgaatgtccggaatgttccattacctggatgctgcagctggccaccccgaccg
U52219	1152	cccgatgaatgtccggaatgttccattacctggatgctgcagctggccaccccgaccg
MRR AA	362	P M N V R N V P L P G D A A A G H P D R
AF003625	31672	tgcctctggccaccctaaagccccattccagatcctcctctgcctatcgcaaatctgcctc
U52219	1212	tgcctctggccaccctaaagccccattccagatcctcctctgcctatcgcaaatctgcctc
MRR AA	382	A S G H P K P H S R S S A Y R K S A S
AF003625	31732	taccaccacaagtctgtcttttagccactccaaggctgcctctggtcacctcaagcctgt
U52219	1272	taccaccacaagtctgtcttttagccactccaaggctgcctctggtcacctcaagcctgt
MRR AA	402	T H H K S V F S H S K A A S G H L K P V
AF003625	31792	ctctggccactccaagcctgcctctggtcacccccaagtctgccactgtctaccctaagcc
U52219	1332	ctctggccactccaagcctgcctctggtcacccccaagtctgccactgtctaccctaagcc
MRR AA	422	S G H S K P A S G H P K S A T V Y P K P

Fig. 5F

AF003625 31852 tgcctctgtccatttcaagggtgactctgtccatttcaagggtgactctgtccatttcaa
 U52219 1392 tgcctctgtccatttcaagggtgactctgtccatttcaagggtgactctgtccatttcaa
 MRR AA 442 A S V H F K G D S V H F K G D S V H F K

AF003625 31912 gcctgactctgttcatattcaagcctgcttccagcaaccccaagcccatcactggccacca
 U52219 1452 gcctgactctgttcatattcaagcctgcttccagcaaccccaagcccatcactggccacca
 MRR AA 462 P D S V H F K P A S S N P K P I T G H H

AF003625 31972 tgtctctgtggcagccactccaagtctgccttcagtgtgtgccaccagccaccctaaacc
 U52219 1512 tgtctctgtggcagccactccaagtctgccttcagtgtgtgccaccagccaccctaaacc
 MRR AA 482 V S A G S H S K S A F S A A T S H P K P

AF003625 32044 catcaagccagctaccagccatgtgtgagccaccactgtgtgactatcccaagcctgccac
 U52219 1572 catcaagccagctaccagccatgtgtgagccaccactgtgtgactatcccaagcctgccac
 MRR AA 502 I K P A T S H A E P T A D Y P K P A T

Fig. 5G

AF003625	32104	taccagccaccctaaagccactgctgctgacaacccctgagctctctgcctcccatggccc
U52219	1632	taccagccaccctaaagccgctgctgctgacaacccctgagctctctgcctcccatggccc
MRR AA	522	T S H P K P A A A D N P E L S A S H C P
AF003625	32164	cgagatccctgccattgcccaccctgtgtctgacgacagtgacctccctgagtcggcctc
U52219	1692	cgagatccctgccattgcccaccctgtgtctgacgacagtgacctccctgagtcggcctc
MRR AA	542	E I P A I A H P V S D S D L P E S A S
AF003625	32224	tagccctgccgctggggccaccaagcctgctgccagccagctggagcttgacaccatcgc
U52219	1752	tagccctgccgctggggccaccaagcctgctgccagccagctggagcttgacaccatcgc
MRR AA	562	S P A A G P T K P A A S Q L E S D T I A
AF003625	32284	tgaccttcctgaccctactgtagtcactaccagtagtaccaatgattaccatgatgtcgtggt
U52219	1812	tgaccttcctgaccctactgtagtcactaccagtagtaccaatgattaccatgatgtcgtggt
MRR AA	582	D L P D P T V V T T S T N D Y H D V V V

Fig. 5H

AF003625	32344	tattgatgttgaagatgatacctgatgaaatggctgtgtgtaaaaatgctctcgtaggtggc U52219 1872 tgtkgtgttgaaagtgccttcgatgaaatggctgtgtgtaaaaatgctctcgtaggtggc MRR AA 602 V D V E D D P D E M A V ^^^
AF003625	32404	caggcagt U52219 1932 caggcagt